COS 125-4 - Post-wildfire forest regeneration under climate change in California, USA

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Thursday, August 10, 2017: 9:00 AM

B118-119, Oregon Convention Center

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Background/Question/Methods

In western U.S. yellow pine and mixed-conifer forests, recruitment of many tree species occurs primarily following wildfire. The post-fire regeneration period thus represents an important opportunity for forest community composition to respond to changing environmental conditions, particularly changes in climate. However, little is known about the effects of weather and climate on tree recruitment in the years following wildfire in these forests. We examined the effect of post-fire weather conditions on tree recruitment in these fire-adapted forests in northern California, USA by surveying regenerating vegetation 4-5 years after 14 different wildfires that burned between 2004 to 2012, a period that captured a wide range of post-fire weather conditions. We related the presence and abundance of seedlings at 456 severely burned plots to the average climate at the plot and to annual departures from the average. For tree species composition to effectively track changes in climate, we would expect that recruitment of a given species at its wet range limit would be stronger when post-fire weather is unusually dry and weaker when it is unusually wet.

Results/Conclusions

Post-fire recruitment patterns were explained more strongly by long-term topoclimatic variables and adult tree species abundance than by post-fire weather conditions. However, for some conifer species we observed a significant pattern of decreased recruitment under unusually dry post-fire conditions, especially in normally wet sites, suggesting limited capacity for forest community composition to track climate change via post-fire recruitment dynamics. In contrast to conifer tree recruitment patterns, shrub recruitment was greater under dry post-fire conditions, particularly in normally wet sites, suggesting that increases in aridity resulting from climate change may lead to greater shrub dominance following wildfire. Our observations are consistent with the existence of “biological legacies” that influence forest response to disturbance, and they imply that even when disturbance creates an opportunity, forest tree communities may not readily track changes in climate through recruitment.

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